during an irregularly distributed two-thirds of the time and mostly over the northern part of the Gulf. For the other third of the period the center was over Bering Sea. Lows descended into western Canada from this region on the 1st, 5th, 11th, 15th, 17th, 20th, and 27th. The lowest observed land-station pressure for the month was 28.86 inches, at Kodiak on the 26th. The minimum recorded by a vessel at sea was 28.92 inches, on board the Japanese S. S. *Alaska Maru* in 44° 21′ N., 147° 13′ W., on the 29th. On the same date the American S. S. *Oduna*, in latitude 55° 51′ N., longitude 145° W., had a barometer reading of 28.97. These instances indicate the great extent of the area covered by very low pressure.

The eastern North Pacific HIGH was best established during the first 20 days of April. Thereafter it was considerably broken up, during the last five days largely by the southward swing of the Aleutian cyclone from the Gulf of Alaska.

Pressure at Dutch Harbor averaged 0.16 inch below normal during the first half of the month and 0.19 inch above during the last half. For the month (29 days) the average pressure, based on p. m. observations, was 29.86 inches, or 0.01 inch above normal. The highest pressure, 30.40, was recorded on the 17th and 20th; the lowest, 29.16, on the 3d. The average pressure at Midway Island was 30.11 inches, or 0.02 inch below normal. The highest reading, 30.30, was recorded on the 26th; the lowest, 29.86, on the 30th. At Honolulu pressure was continuously below normal from the 3d to the 23d, the average daily departure (p. m. observations) being −0.09 inch. The average pressure for the month was 30.01 inches, or 0.05 inch below normal. The highest reading, 30.14, was recorded on the 29th; the lowest, 29.85, on the 6th.

Aside from the storm conditions previously noticed, it is observed that a greater part of the northern steamship routes had more gales on the 1st, 2d, and 3d than on any other day or period of days during the month. These gales did not as a rule exceed 8 or 9 in force, but they were accompanied by frequent snow squalls in higher latitudes and raised high seas both east and west of the 180th meridian.

The American S. S. *West Cayote*, Capt. L. Johnson, bound from Portland toward Yokohama, encountered rougher weather probably than any other vessel making a trans-Pacific voyage in April. From the 1st to the 10th, or during most of the westward passage, she passed through a succession of westerly to northerly gales, which did not, however, exceed 9 in force. Her lowest observed pressure was 29.01 inches in 52° 17′ N., 163° 05′ W., on the 3d.

There was little storm activity reported for the greater body of the ocean from the 10th to the 25th. The maximum number of stormy days occurred over and to the southward of the Gulf of Alaska, as might be inferred from the greater prevalence there of the Aleutian cyclone, especially during the last week. This cyclone reached its peak of severity on the 29th, at which time the S. S. *Alaska Maru* experienced her lowest pressure, as already noted, and also sustained a west-southwesterly wind of hurricane force from 4 p. m. until midnight, near 44° N., 147° W. This was the only gale of the month, so far as known, to exceed 10 in force.

Fog, especially in east longitudes, along the sailing routes, showed a decided increase in percentage over that of March. It was observed along practically the entire China coast on the 10th, and in the neighborhood of Shanghai continued until the 16th. Fog also occurred on several days along the American coast, being noted from Puget Sound southward to near Acapulco.



## DETAILS OF THE WEATHER IN THE UNITED STATES

### GENERAL CONDITIONS

By ALFRED J. HENRY

A warm dry month on the Pacific coast, also warm in the great interior valleys; elsewhere the temperature was close to the normal. More than the normal precipitation in Atlantic coast States and in some of the Gulf States, also in the upper Mississippi Valley. See the inset on Chart IV. The usual details follow.

### CYCLONES AND ANTICYCLONES

By W. P. DAY

The movement of the low-pressure areas during the month of April, 1924, was even more erratic than usual for a month which has long been characterized by halting, undecided, and abnormal storm movements. One storm, which developed over Nevada on the 22d, after moving eastward in the normal manner to northwestern Missouri, turned northward and northwestward and finally dissipated over northeastern Montana. In this case the air flow within the LOW was diverted by the intrusion to the east of a large area of high barometric pressure from the Hudson Bay region. A large number of the low-pressure areas had the so-called trough formation in which the point of lowest barometer is a rather indefinite and shifting phenomenon. One of the most severe storms of the month on the Atlantic coast suddenly developed in the southern end of one of these troughs during the 6th in the vicinity of the Virginia Capes, moved northeast to New England, and thence eastward into the Atlantic.

### FREE-AIR SUMMARY

By V. E. JAKL, Meteorologist

The average free-air conditions over that portion of the country represented by aerological stations were practically normal in all respects. This is evidenced by Tables 1 and 2, from which it will be noted that the departures from the normal were slight for all elements, although there were a few exceptions. Such exceptions were plausibly accidental rather than real, owing to the circumstance of observation. As kite flights are dependent upon suitable wind and weather, observations by means of them can not be carried on even to moderate altidudes with the regularity characteristic of surface meteorological work. The scattered departures of apparently decided value noted in Tables 1 and 2 need not therefore merit other than passing notice.

Such slight temperature departures as recorded in the general averages are in close agreement geographically—also in character and amount—with the surface departures that appear on Chart III. Inferentially, the causes contributing to the observed average temperatures on the ground extended aloft to the upper limit of observation. For example, the principal periods of cool weather east of the Rocky Mountains, in so far as they are revealed in aerological records, occurred on the 1st–2d, 9th–10th, and 17th–18th. Kite flights made at stations